

Patent claims

1. A document of value (1, 14) such as a paper of value or ID card with a security element (23, 24, 25, 26, 27) having at least one optically variable material (15, 39, 40, 41) that conveys different color effects at different viewing angles, and at least one machine-readable feature substance (16, 17, 18, 19, 30, 37) that does not impair the visually visible optically variable effect of the optically variable material (4, 15), the feature substance (16, 17, 18, 19, 30, 37) being present in the form of a coding or alphanumeric information.

2. A document of value (1, 14) according to claim 1, characterized in that the security element (23, 24, 25, 26, 27) consists of a printed image having a first printed layer (16, 37) containing the feature substance (17, 30, 32), said printed layer being in the form of the coding or alphanumeric information, and an optically variable material (15, 39, 40, 41) disposed over said printed layer (16, 37).

3. A document of value according to claim 1 or 2, characterized in that the security element (26, 27) has a second printed layer (31, 36) containing no feature substance that is disposed in register with the first printed layer (16, 37) and shows the same visual appearance as the first printed layer (16, 37).

4. A document of value (1, 14) according to at least one of claims 1 to 3, characterized in that the first printed layer has a dark, preferably black, color.

5. A document of value (1, 14) according to at least one of claims 1 to 4, characterized in that the security element (23, 24, 25, 26, 27) has two liquid-crystal materials (40, 41) with different polarization properties.

6. A document of value (1, 14) such as a paper of value or ID card with a security element (5) having at least one optically variable material that conveys different color effects at different viewing angles, and at least one machine-readable feature substance that does not impair the visually visible optically variable effect of the optically variable material, the optically variable material and the feature substance being disposed in one layer (4) and said layer (4) being present in the form of information.

7. A document of value (1, 14) according to claim 6, characterized in that the layer (4) is present on the document of value (1) in the form of a print.

8. A document of value (1, 14) according to claim 6 or 7, characterized in that the layer (4) has a binder of electrically conductive material and optically variable pigments dispersed therein.

9. A document of value (1, 14) according to at least one of claims 1 to 7, characterized in that the security element (5, 23, 24, 25, 26, 27) is disposed on a plastic foil that is connected with the document of value (1, 14).

10. A document of value (1, 14) such as a paper of value or ID card with a security element (21) having at least one optically variable material that conveys different color effects at different viewing angles, and at least one machine-readable feature substance (8) that does not impair the visually visible optically variable effect of the optically variable material, the optically variable material and the feature substance (8) being disposed in one layer and said layer being a self-supporting plastic foil (9).

11. A document of value (1, 14) according to at least one of claims 1 to 10, characterized in that the plastic foil (9) is present in the form of a thread or band that is freely accessible at least partially on the surface of the document of value (1).

12. A document of value (1) according to at least one of claims 1 to 10, characterized in that the plastic foil (9) is present in the form of a label that is applied to the document of value (1).

13. A document of value (1, 14) according to at least one of claims 1 to 10, characterized in that the plastic foil (9) forms a cover foil of the document of value.

14. A document of value (1, 14) according to at least one of claims 1 to 13, characterized in that the optically variable material (4, 7, 9, 15) is a liquid-crystal material.

15. A document of value (1, 14) according to at least one of claims 1 to 14, characterized in that the optically variable material (4, 7, 9, 15) is a liquid-crystal polymer material or microencapsulated liquid-crystal material.

16. A document of value (1, 14) according to at least one of claims 1 to 13, characterized in that the optically variable material (4, 7, 9, 15) is an interference layer material.

17. A document of value (1, 14) according to at least one of claims 1 to 16, characterized in that the optically variable material (4, 7, 9, 15) is a pigment or a particle with suitable size and shape factor.

18. A document of value (1, 14) according to at least one of claims 1 to 17, characterized in that the machine-readable feature substance (8, 18, 19) is transparent in the visible spectral region.

19. A document of value (1, 14) according to at least one of claims 1 to 18, characterized in that the machine-readable feature substance (8, 19) is a material luminescing outside the visible spectral region.

20. A document of value (1, 14) according to claim 19, characterized in that the luminescent substance is an inorganic luminescent substance.

21. A document of value (1, 14) according to at least one of claims 1 to 20, characterized in that the machine-readable feature substance (8) is an IR-absorbent material.

22. A document of value (1, 14) according to at least one of claims 1 to 21, characterized in that the security element is present on the document of value as a multilayer transfer element in whose layer structure the optically variable material and feature substance are disposed.

23. A foil (9) having at least one optically variable material (7, 9, 15, 39, 40, 41) that conveys different color effects at different viewing angles, characterized in that the foil (9) additionally has at least one machine-readable feature substance (8) that does not impair the visually visible optically variable effect of the optically variable material.

24. A foil (9) according to claim 23, characterized in that the foil (9) consists of a polymer material in which optically variable pigments and the feature substance (8) are embedded.

25. A foil (9) according to claim 23, characterized in that the foil (9) consists of a liquid-crystal or electrically conductive polymer material in which the feature substance (8) is embedded.

26. A foil according to at least one of claims 23 to 25, characterized in that a security element (23, 24, 25, 26, 27) is disposed on the foil (9), said element consisting of a printed image having a first printed layer (16, 37) containing the feature substance (17, 30, 32), and an optically variable material (15, 39, 40, 41) disposed over said printed layer (16, 37).

27. A multilayer transfer material (22) having at least one optically variable material (12) that conveys different color effects at different viewing angles, characterized in that the transfer material (22) additionally has at least one machine-readable feature substance (8) that does not impair the visually visible optically variable effect of the optically variable material (12).

28. A multilayer transfer material (22) according to claim 27, characterized in that the transfer material is formed as a hot stamping foil or label material.

29. A printing ink having at least one binder and one optically variable material that conveys different color effects at different viewing angles, characterized in that the printing ink additionally has at least one machine-readable feature substance (8) that does not impair the visually visible optically variable effect of the optically variable material.

30. A printing ink according to claim 29, characterized in that the printing ink contains optically variable pigments in 10 to 30 wt% and feature substance in 0.01 to 30 wt%, preferably 0.01 to 10 wt%, based on the binder.

31. Plastics pellets, characterized in that the plastic pellets have at least one optically variable material that conveys different color effects at different viewing angles and at least one machine-readable feature substance that does not impair the visually visible optically variable effect of the optically variable material.

32. Use of a foil (9) according to at least one of claims 23 to 26 for producing security elements or documents of value.

33. Use of a multilayer transfer material (22) according to claim 27 or 28 for producing security elements or documents of value.

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